

What is claimed is:

1. A high-melting superalloy comprising (A) from 5 to 65 atomic % of nickel and (B) from 5 to 20 atomic % of at least one metal selected from the group consisting of titanium, zirconium, hafnium, vanadium, niobium, and tantalum, with (C) from 30 to 75 atomic % of iridium or rhodium, or a mixture thereof, wherein a LI_2 phase precipitated in a fcc phase of the matrix phase, and an amount of the LI_2 phase is from 20 to 80% by volume.
2. The high-melting superalloy according to claim 1, wherein an atomic % of sum of (A) and (B) is from 20 to 70 %.
3. The high-melting superalloy according to claim 1 or 2, wherein, in case that the metal (c) is iridium, an atomic ratio of (A) to (B) is from 0.3:1 to 8:1.
4. The high-melting superalloy according to claim 1 or 2, wherein, in case that the metal (c) is rhodium the atomic ratio of (A) to (B) is from 0.25:1 to 12:1.
5. The high-melting superalloy comprising (A) from 4 to 86 atomic % of nickel, (B) from 0.5 to 20 atomic % of at least one metal selected from the group consisting of titanium, Zirconium, hafnium, vanadium, niobium, and tantalum, and (C) from 4 to 86 atomic % of iridium or rhodium, or a mixture thereof, with (D) from 0.4 to 20 atomic % of alminum, wherein a LI_2 phase is precipitated in a fcc phase of the matrix phase, and an amount of the LI_2 phase is from 20 to 80% by volume.

6. The high-melting superalloy according to claim 5, wherein the sum of atomic % of (A) and (C), and (B) and (D) are set as follows,

$$(A) + (C) \geq 75 \text{ atomic \%}$$

$$(B) + (C) \leq 25 \text{ atomic \%}$$

7. A method of producing a high-melting superalloy as set forth in any of claims 1 to 4, which comprises compounding at least one of an iridium-base superalloy made of iridium as a base added with at least one metal selected from the metal group consisting of titanium, zirconium, hafnium, vanadium, niobium, and tantalum and a rhodium-base superalloy made of rhodium as a base added with at least one metal selected from the above-described metal group, with nickel, followed by ingoting to produce a high-melting superalloy.

8. A method of producing a high-melting superalloy as set forth in any of claims 1 to 6, which comprises compounding at least one of an iridium-base superalloy made of iridium as a base added with at least one metal selected from the metal group consisting of titanium, zirconium, hafnium, vanadium, niobium, and tantalum and a rhodium-base superalloy made of rhodium as a base added with at least one metal selected from the above-described metal group, with a nickel-base alloy made of nickel as a base added with at least one metal selected from the above-described metal group, or aluminum, followed by ingoting to produce a high-melting superalloy.